

Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 29.

July, 1927.

No. 343.

CONTRIBUTION TO THE FLORA OF THE ISLANDS OF ST. PIERRE ET MIQUELON.

BRO. LOUIS ARSÈNE.

PART I. GENERAL CONSIDERATIONS.

I. FIRST EXPLORATIONS.

Gautier and his work. The first work of any consequence written on the flora of the Islands of St. Pierre et Miquelon—the French Archipelago to the south of Newfoundland—is found in a thesis of Mr. Gautier, a chemist to the French Navy, published at Montpellier, France, in 1886,¹ and now so rare that it is next to impossible to find it. I owe to Mr. Flahaut, the eminent professor at the University at Montpellier, the advantage of having a copy of that thesis lying before me. He was good enough to have it typewritten from the bulky quarto volume in the library of the University, where the theses of the School of Pharmacy are bound, and he has carefully verified by himself the copy made. He will allow me to present him my grateful acknowledgements.

At the time the Gautier thesis was published, the knowledge of the plants of the region of Newfoundland was very incomplete: thus a good number of his determinations are erroneous; and, on the other hand, we do not know whether or not he left a collection of the plants which he had gathered. He does not name any locality, and, more than once, he simply states the genus without clearly designating the species. After a minute examination of his text, I am prepared

¹ Alphonse Gautier, Pharmacien de la Marine: Quelques mots sur l'Histoire naturelle et la météorologie des Iles St. Pierre et Miquelon (Terre-Neuve). Montpellier, 1886.

to say that he records 181 species, indigenous or introduced, of Phanerogams and vascular Cryptogams. He systematically leaves aside certain genera and whole families. For instance, he records but 3 *Cyperaceae*, without naming a single *Carex*.

Bonnet's Flora.—In 1887, Dr. Bonnet of the Muséum d'Histoire naturelle at Paris published in the "Journal de Botanique" his *Florule des Iles Saint-Pierre et Miquelon*¹ based on the specimens preserved in the Museum, and derived from three different sources:

a. The herbarium of De La Pylaie, made up after this botanist's explorations in the French Islands in 1816, 1819 and 1820, and comprising 215 species.

b. A small collection of 38 species, made in 1822, during a cruise, by Beautemps-Beaupré, a naval officer.

c. A collection of 145 species presented to the Museum in 1883 by Dr. Delamare of Miquelon.

Delamare's Flora.—The following year, in 1888, Dr. Delamare published in collaboration with Renaud and Cardot, his *Florule de l'île Miquelon*.¹ This work records 246 species of vascular plants, among which are included the 145 species spoken of above, and 101 others.

Delamare did not explore St. Pierre, and his investigations in the Island of Miquelon were brought to bear chiefly on the Cryptogams exclusive of Algae. So one must not wonder that he did not record a considerable number of plants which, if not common, at least are far from being rare, and some of which grow quite near the Village of Miquelon where he lived.

Results achieved by my predecessors. Of the 38 species recorded by Beautemps-Beaupré, 14 were not included in the series of 215 species found by De La Pylaie. Gautier added 63 species to the discoveries of his two predecessors, discoveries that, moreover, were most likely unknown to him; he confirmed 118 of their records, but 111 species seen by them escaped his notice altogether. As to Delamare, his lists contain 66 new species and 180 confirmed. After his researches, the ensemble of the vascular flora of the Islands comprised 358 species of which 112 had not been found by him. Among those 358 species, 283 might be considered as native, and 75 as introduced.

¹ "Journal de Botanique" de Morot, i. Paris, 1887.

¹ *Florule de l'île Miquelon* par E. Delamare, F. Renaud et J. Cardot. Lyon, 1888

II. MY OWN INVESTIGATIONS.

A residence of several years at St. Pierre and frequent crossings to Grande Miquelon and to Langlade (which are respectively the northern and southern parts of the Island of Miquelon, united by a sand isthmus 7 miles long) have enabled me not only to trace out the greater part of the species mentioned by the botanists who have preceded me, but to discover 129 others—108 native and 21 introduced—which must in future take their place in the recorded flora of St. Pierre et Miquelon.

My botanical studies in that country were made from 1899 to 1903, and it was chiefly during the summers of 1900, 1901, and 1902 that my researches were pushed ahead. I have the advantage of having preserved the notes I made from day to day after each of my explorations, and I glean therein that out of 130 botanical excursions, 82 were in St. Pierre, 27 in Grande Miquelon and 21 in Langlade. That shows that I have chiefly studied the flora of St. Pierre. So, I have good reason to believe that very few species found by De La Pylaie and Gautier in this small Island have escaped my observation.

I ascertained in the whole Archipelago the presence of 454 species of vascular plants, and I gathered them all with the exception of 4 of the most common. Unfortunately, the specimens of 18 species were not preserved by me; either because they were lost after my departure from St. Pierre in July, 1903; or because they were destroyed after identification, as being insufficient for preservation in a herbarium and with the view of making another collection which my sudden and final departure did not allow me to realize.

During the year 1926, I sent to Professor Fernald specimens—a few of them only fragmentary—of 430 species¹ taken out of my herbarium of St. Pierre et Miquelon. This collection will remain in the Gray Herbarium of Harvard University. The specimens of two other species that I have been unable to supply to Mr. Fernald—*Habenaria Hookeri* and *Pyrola minor*—will be found in the New York Botanical Garden. Moreover, in 1906, I sent to that Institution a good number of native and introduced plants, chiefly those whose identification

¹ With regard to *species*, it must be understood once for all, that in the statistics of this little work of mine, the word is taken in rather a broad sense: it includes the varieties bearing a name and having often been considered as *species* properly so called by certain botanists. In the whole flora, there are 77 varieties, 1 form and 1 hybrid. In 56 cases, the species is represented only by a variety, the type being unknown in the Islands; 3 species are represented by 2 or 3 varieties without the type being present; only 13 species have the type and its variety.

could, in my opinion, present some difficulty. Dr. Britton and Dr. Small examined these plants, and the latter had the kindness to send me his remarks with the list of the corrections to be made upon my determinations. But the study of the plants of northeastern America has made such strides these last twenty years, the botanical nomenclature relating to this region has been so modified, that it appeared prudent for me to publish nothing about the flora of St. Pierre et Miquelon Islands without laying my work before the eminent specialist on the flora of Newfoundland and neighboring regions. My best thanks are due to Professor Fernald for having kindly verified my determinations, and for rectifying them in case of need. The report he sent on my herbarium, with documents on the critical species, enabled me to bring up to date the notes I present to the readers of RHODORA.

III. THE ENSEMBLE OF THE FLORA.

The flora of St. Pierre et Miquelon as it is made out in the general list which I give at the end of the present paper, numbers 487 species, of which 391 are native and 96 introduced. I have included therein 33 species—of which 6 are introduced—brought to notice by my predecessors and which I have not found: 8 by De La Pylaie, 1 by Beautemps-Beaupré, 18 by Gautier and 6 by Delamare.

There would have been a much larger number if we were to include all the names given to the plants of the Islands by Gautier, Bonnet and Delamare, for not only Gautier, but even Bonnet and Delamare made obvious mistakes, and their identifications cannot reasonably be maintained in their entirety. In about 85 cases, after a very special study of each one, I had to transfer under other headings the names of the plants they referred to. Only a comparison between the plants gathered by them and those gathered by me would help settle any remaining doubts. It is more than likely that among the 18 species reported by Gautier and not met with again, several, because of some error in the naming, are contained in the lists of Bonnet and Delamare, or in mine. I have left them in the general list because there might be some possibility of their presence in St. Pierre et Miquelon; besides, has not experience warned botanists how imprudent it is to reject, with too great a facility, the affirmations of those who have preceded and opened up the way for them? Likely enough some of the names rejected by me ought to be maintained,

as they are, in the flora, or be brought under names different from those to which I connected them.

Of the 113 species recorded by his predecessors and not found by Delamare, 77 had been brought to notice by De La Pylaie, 5 by Beautemps-Beaupré and 31 by Gautier. Whilst I succeeded in rediscovering 69 of the non-confirmed plants of De La Pylaie and 4 of those of Beautemps-Beaupré, I was quite unable to find more than 13 of Gautier's. That is a much smaller proportion, and such a result seems to justify the remark made above regarding the plants of Gautier which have not been found again.

IV. NATURE OF THE SOIL AND PRINCIPAL STATIONS.

Gautier and Delamare have treated of the physical geography and climatology of the Islands and it is not my intention to make any reference to them. I am not aware that the country was ever visited by a trained geologist and that any work of a serious nature has been published on its geological constitution and the history of its rock-formations. I personally deeply regret not to have profited by the opportunity I had, when living there, to study more carefully the nature of the soil and the intimate relations between it and the flora.

The Islands are formed of reddish porphyritic rocks with veins of quartz, as can be easily seen by examining the rugged cliffs of almost the entire coast-line, or the barren summits and slopes of the hills where the rock is denuded. Granite is found at Cap Blanc in Grande Miquelon and argillaceous schists in Langlade. Pure limestone and calcareous formations of any kind are entirely absent; nevertheless some calcicoles are found in Miquelon: *Equisetum scirpoides*, *Listera convallarioides*, *Laportea canadensis*, *Geranium Robertianum*.

I do not feel myself competent enough to give an opinion of any weight regarding the glaciation of the Archipelago. The erratic boulders which are seen, at certain places along the coast, between the lines of low and high water, have very likely been brought there by floating icebergs rather than by the work of glaciers. Gautier thinks the numerous isolated rocks, of various nature, which cover the southern plain of St. Pierre between the Town and Anse à Ravenel and Savoyard Point have the same origin and were carried there when that part of the Island was submerged. Does not the presence in Miquelon of *Alchemilla alpina*, which is only to be found

in America on one of the summits of the Colorado Mountains, supply us with an argument in favor of the non-glaciation of the Miquelon Archipelago? I am inclined to think it was spared or hardly touched by the glaciers which during the Pleistocene time invaded the centre of Newfoundland; if there was a glaciation it was only local.¹

The principal stations where the native vegetation thrives are the following: (1) maritime sands, sandy beaches and shingle banks, firm and movable dunes; (2) rocky cliffs and landslips on the seashore, maritime hillsides; (3) salt marshes and meadows, brackish slime, and ponds communicating with the sea; (4) inland bogs and swamps, peaty moors and plains, marshy borders of ponds and brooks, fresh water ponds; (5) rugged summits and naked slopes of hills, gravelly and rocky barrens; (6) grassy slopes and semi-wooded bases of the hills, grassy plains neither sandy nor boggy; (7) wooded valleys.

The first is most interesting and of a wide range, for it includes the plain of Miquelon near the Village, and the Isthmus of Langlade whose total area is not much below that of the whole Island of St. Pierre. They constitute, so to say, the only alluvial soil of Miquelon. Their flora, especially that of the southern and northwestern dunes of the Isthmus, resembles much that of Sable Island.

The number of species essentially maritime, growing only in stations 1, 2 and 3, is not very high: hardly 40 species, that is 10% of the native flora.

In station 1, we find: *Agrostis alba*, var. *maritima*, *Ammophila breviligulata*, *Festuca rubra*, var. *oraria*, *Elymus arenarius*, var. *villosus*, *Juncus balticus*, var. *littoralis*, *Atriplex glabruiscula*, *Salsola Kali*, *Polygonum Raii*, *Spergularia salina*, *Sagina nodosa*, *Arenaria peploides*, var. *robusta*, *Cakile edentula*, *Potentilla Anserina*, *Lathyrus maritimus*, *Convolvulus sepium*, var. *pubescens*, *Mertensia maritima*. In station 2: *Cochlearia cyclocarpa*, *Sedum roseum*, *Ligusticum scothi-*

¹ [Bro. Arsène's belief that the French Islands were hardly touched by the Wisconsin glaciation finds strong support in the conclusions of Coleman regarding Newfoundland: "that there is evidence in Newfoundland of early Pleistocene glaciation by ice caps . . . The retreat of the early ice sheet, which was probably of Kansan or Jerseyan age, was followed by great emergence of the land . . . The effects of the early glaciation have been greatly obscured by later processes, and the ancient glaciated surface is in most places covered with débris and fragments of the underlying rock resulting from long-continued weathering . . . Probably hundreds of thousands of years elapsed . . . before the still fresh boulder clay and striated surfaces were formed by the less extensive Wisconsin ice sheets . . . The Wisconsin ice probably covered less than half the island and was in the form of small separate sheets or valley glaciers."—Coleman, *The Pleistocens of Newfoundland*. Journ. Geol. xxxiv. 193-223 (1926).—M. L. F.]

cum, *Coelopleurum lucidum*, *Plantago juncoides*, var. *decipiens*, *Senecio Pseudo-Arnica*. In station 3: *Ruppia maritima*, var. *obliqua* (in brackish water), *Zostera marina*, var. *angustifolia* (in sea water), *Triglochin maritima*, *Scirpus americanus*, *Carex exilis*, *Carex maritima*, *Carex salina*, var. *kattegatensis*, *Iris setosa*, var. *canadensis*, *Rumex mexicanus*, *Chenopodium rubrum*, *Montia lamprosperma*, *Ranunculus Cymbalaria*.

It is impossible to draw a sharp line between the three stations, even for strictly halophilous plants: a number of the plants of station 1 are found in station 2 or 3 and vice versa. Halophytes very often live in close association with non-maritime species which have invaded their special habitats and are thoroughly established there. But the sea beach itself, especially when formed of pure sand or pebbles, is often bare of vegetation, with the exception of a few salt-loving plants such as *Arenaria peploides* and *Cakile edentula*.

If the flora of the Islands has a distinctive aspect of dreariness and monotony, it is, above all, due to the third and fourth stations. It may be safely asserted that the ponds, swamps, marshes and bogs cover more than half of their area, and 200 species at least, that is more than 50% of the native flora, are marshy aquatic or semi-aquatic plants.

The genus *Carex* seems to me the most striking of the paludal flora of the Islands. Nevertheless, it has been little studied by my predecessors since they have recorded but 11 species in all: I have been able to find 9 of these 11, and I have discovered 31 others. The 42 species of *Carex* of St. Pierre et Miquelon represent 1/9 of its flora, whereas this same genus represents but 1/22 of the flora of northeastern America, and hardly 1/40 of that of France.

Among the families that deserve very special attention, let me mention the *Orchidaceae* and the *Ericaceae*. It is a marvellous thing to see, in summer, extensive areas of the otherwise dreary bogs and barrens of the Islands literally covered with their colonies in full bloom.

There are 24 species of *Orchidaceae*, that is 6% of the flora; the proportion in northeastern America is 2% and in France 1.7%. The number of *Ericaceae* is about the same: 25 species, a little more than 6.6% of the flora, a high proportion when compared with the 2.4% of northeastern America and, above all, with the 0.7% of France.

The wooded valleys of Langlade form a station affording also much

interest. By their great extent they allow vegetation to expand and grow in a way quite unknown in Grande Miquelon and particularly in Saint Pierre. Among the 70 species that I have not been able to trace in the last Island, and which, in the present state of our knowledge, might be regarded as peculiar to Miquelon Island, there are more than 30 that belong exclusively to the valley of Belle Rivière, and to the neighbouring valleys of Anse aux Soldats and Anse à Ross. In my expeditions, only about a dozen of the species of Saint Pierre have not been met with either in Grande Miquelon or in Langlade. But it would be rash to affirm that they do not grow there. In fact I have explored the Island of Miquelon—whose area is 9 times that of Saint Pierre—but casually; and I feel sure I have not seen half of the interesting localities of Grande Miquelon, nor a quarter of those of Langlade, and it may be safely asserted that the greater part of the latter has never been visited by a botanist. So I am convinced that new investigations will allow of the adding of a good number more of species to the flora of the Archipelago. There must be more than 450 native species. That is a much greater number than the total put forward by Dr. Bonnet; he estimated that the 269 species—native and introduced—recorded in his “Florule” represented 8/10 of all the plants that grow in Saint Pierre et Miquelon. That was leaving the impression that the total of native species could hardly be greater than 260. It is more than likely he would never have drawn such a conclusion had he visited the French colony of Newfoundland.

One family especially does not seem to be sufficiently represented in the flora as it is known to us. Only 15 native species of *Compositae* have been observed in St. Pierre et Miquelon; that is about 1/26 of the phanerogamous flora. Such a number appears much inferior to what one would expect in a country where the stations are many and, in some degree, varied. For the East of Canada and the United States, the proportion is 1/8. That is also the ratio in France.

It would be well to look for the following species of *Compositae* which grow in southern Newfoundland: *Eupatorium maculatum*; *Solidago sempervirens*, *uliginosa*, *graminifolia*; *Aster puniceus* and *novi-belgii*; *Erigeron ramosus* and *annuus*; *Bidens frondosa*; *Prenanthes nana*.

V. PHYTOGEOGRAPHY.

(a). *Introduced Plants.*

To examine in a rational way the geographical affinities of the flora of St. Pierre et Miquelon, we must put aside the 96 introduced species. This number, which is 1/5 of the whole flora, may appear considerable. But the colony was inhabited even before Canada and the United States: we have proofs that it was visited by Breton and Basque fishermen as early as 1504, and that permanent settlements were made from 1600 onward. It is likely that some of the plants introduced are not yet naturalized; they are seldom found and always in a more or less isolated state. But the greater number among them seem to have adapted themselves to the climate and soil; many have spread so far into the interior of Grande Miquelon and Langlade that it is difficult to distinguish them from the indigenous plants.

Among those whose right to be called native is doubtful, I shall mention especially: *Primula veris*, which I came across in but one locality, near the Town of St. Pierre; *Myosotis arvensis* and *Erigeron canadensis*, indigenous on the American continent, but which I did not notice in the interior of Langlade or Grande Miquelon; *Anagallis tenella*, reported by both Gautier and Delamare, which I was unable to find despite a special search for it, and which, moreover, has not yet been observed in America; *Carex remota*, a Europeo-Asiatic plant reported by Delamare which, also, escaped my notice.

I have, notwithstanding, included these five species in the list of native plants. In regard to *Carex remota*, it seems impossible to treat it as an introduced species, if it were really ever found in Miquelon. It may be that Delamare mistook for it a plant common in bogs and which resembles it in general appearance, *Carex canescens*, var. *disjuncta*. But the fact that *C. remota* was reported from Newfoundland by Despreaux in the beginning of the last century pleads in favour of its maintenance in the indigenous flora of St. Pierre et Miquelon. There are no specimens of *Carex remota* from Delamare in the Museum of Paris: Dr. Bonnet mentions as coming from him only *Carex aperta* and *folliculata*; so, it seems impossible to settle the question with the documents now available.

(b) *Relations between the Flora of the French Islands and that of the Neighbouring Countries.*

I have not a sufficient knowledge of the flora of northeastern

America to treat in a competent way of the relations between the flora of St. Pierre et Miquelon and that of the adjacent regions: Newfoundland, Labrador, Nova Scotia and Sable Island, Prince Edward, Cape Breton and Magdalen Islands, Gaspé Peninsula, New England and its alpine areas, etc. I leave to Professor Fernald and his associates of the Gray Herbarium the task of studying this interesting matter, fortunate if I have been able to supply them with any new data.

I shall content myself with the following remarks.

Newfoundland.

In his *Notes upon the Flora of Newfoundland*,¹ Dr. Edwin H. Eames reports, as worthy of notice, 267 plants collected by him in July and August, 1908, in the regions of Bay of Islands and Bay St. George. Out of this number, 164 species—61%—are found in the French Islands, 200 miles distant, a striking proof that their flora is near that of the West of Newfoundland. Nevertheless, St. Pierre et Miquelon have only a few—15 perhaps—of the plants special to the Long Range, isolated species of the West of America, or endemics of western affinity whose number Professor Fernald estimates at 160 at least.

To be sure, the Miquelon flora is yet nearer that of the South of Newfoundland and very likely it does not differ in any way from that of the Burin Peninsula. Miquelon Island, geographically and geologically, is but an extension of the last, a few miles to the West. But was the Peninsula ever visited by botanists? My own explorations there were limited to a few walks in the vicinity of St. Lawrence on Placentia Bay, and Grand Bank on Fortune Bay.

It would doubtless be interesting to compare botanically the French Islands with the Avalon Peninsula, in the Southeast of Newfoundland. A certain number of European plants, unknown or very local on the American continent—except perhaps in Nova Scotia and the region bordering the Gulf of St. Lawrence—and growing in that part of Newfoundland, have not been found in St. Pierre et Miquelon, but it would be well to look for them there. I may mention: *Agrostis canina*, *Sieglingia decumbens*, *Nardus stricta*, *Glyceria fluitans*, *Festuca capillata*, *Carex leporina*, *Ranunculus hederaceus*, *Potentilla procumbens*, *Galium saxatile*, *Pedicularis sylvatica* and *palustris*, every

¹ RHODORA, xi. 85-99, May, 1909.

one of them native in the Island of Jersey. I do not speak of *Calluna vulgaris*, *Arbutus Unedo* and *Saxifraga Geum*; there is not the least chance of finding them in St. Pierre et Miquelon. The following European plants are native in the French colony as in the Avalon Peninsula: *Potamogeton polygonifolius* (also on Sable Island), *Deschampsia caespitosa* (the type, large paniced), *Juncus bulbosus* (Sable Island), *Juncus effusus*, var. *conglomeratus*, *Luzula campestris*, var. *congesta*,¹ *Polygonum Raii*, *Ranunculus Flammula*, *Pyrola rotundifolia*, var. *arenaria*. I am asking myself if *Veronica officinalis* of Miquelon is not identical with the special form, not yet sufficiently studied, which Professors Fernald and Wiegand collected in mossy swales and spruce woods of the Avalon Peninsula in 1911.²

The following plants, numbering ten, have not yet been reported from Newfoundland, but they are likely to be found at least in Burin Peninsula:³ **Equisetum littorale*, **Juncus articulatus*, var. *obtusatus*, **Luzula saltuensis*, **Laportea canadensis*, *Thalictrum dioicum*, *Alchemilla alpina*, *Epilobium angustifolium* var. *macrophyllum*, **Bartonia virginica*, *Houstonia Faxonorum*,⁴ **Convolvulus sepium*, var. *pubescens*.

To this list there is no longer any reason to add *Mitchella repens* as it was found for the first time in Newfoundland, near Port aux Basques, by Mr. Bayard Long in 1924.⁵

Southern Labrador.

The flora of St. Pierre et Miquelon is equally similar to that of southern Labrador. Out of the 195 native plants collected by Mr. R. H. Wetmore near Hamilton Inlet and Lake Melville in the summer of 1921,⁶ 124 at least, that is 64%, are also native in the Islands, though the distance is not less than 600 miles.

Sable Island.

I have already had an opportunity to bring together, in a botanical point of view, Sable Island and Miquelon. 2/3 of the plants native in Sable Island as recorded by Dr. St. John⁷ belong also to the flora

¹ Known only in S.W. Newfoundland: RHODORA, xxviii. 56 (1926).

² RHODORA, xxviii. 81 (1926).

³ The plants marked * grow in Nova Scotia.

⁴ *Houstonia Faxonorum* (Pease & Moore) Fernald, n. comb., to be published with these notes.

⁵ RHODORA, xxviii. 56 (1926).

⁶ RHODORA, xxv. 4-12 (1923).

⁷ St. John: Sable Island; Proceedings of the Boston Society of Natural History; Vol. vi. No. 1. 1921.

of Miquelon. I shall specially mention the endemic *Lathyrus palustris* var. *retusus*. Perhaps *Centaurium umbellatum*, native in Sable Island, might be found in the sand plains and dunes of Miquelon, but I never saw it; it is abundant in the sandy barrens of Jersey under the characteristic form of var. *ellipticum* Druce. Some other Sable Island plants ought, in my opinion, to be searched for in Miquelon: *Agropyron repens*, var. *pilosum*, *Carex hormathodes*, *Carex silicea*, *Tillaea aquatica*, *Rosa virginiana*, *Oenothera cruciata*, *Centunculus minimus*, *Teucrium canadense*, *Euphrasia purpurea*, *Gnaphalium obtusifolium*. I think I found *Tillaea aquatica* in 1902 near the Grand Barachois, but it was late in the season, the flowers were gone and I did not take specimens, hoping to make a future collection.

Nova Scotia.

Out of the 480 native plants which in his work on the flora of Nova Scotia¹ Professor Fernald reports as remarkable in some way, about 110—only 23%—are known in St. Pierre et Miquelon. I feel that a comparison cannot be judiciously made if grounded on the very special plants enumerated in the above-mentioned work, and very likely representing less than one half of the flora of the silicious southwestern part of the Peninsula. However, the small proportion we get shows very clearly the greater disparity existing between St. Pierre et Miquelon and Nova Scotia on one side, as compared with Labrador or Newfoundland on the other.

One thing must be noted at the same time: that the similarity of the geological constitution and the climatic conditions in southwestern Nova Scotia and St. Pierre et Miquelon (as also in S. E. Newfoundland) give a somewhat similar general appearance to their vegetation, particularly that of their peaty bogs, savannahs, barrens, and of their numerous ponds. So a good number of the characteristic southern costal plain species—whose range sometimes extends as far as Florida and the Gulf of Mexico—growing abundantly in Nova Scotia are likewise found in St. Pierre et Miquelon. I may mention *Schizaea pusilla*, *Potamogeton bupleuroides*, *Calamagrostis Pickeringii*, var. *debilis*, *Eriophorium virginicum*, *Carex vulpinoidea*, *C. stipata*, *C. leptalea*, *C. intumescens*, *Juncus effusus*, var. *solutus*, *Iris versicolor*, *Habenaria clavellata*, *H. blephariglottis*, *Pogonia ophio-*

¹ Fernald: The Gray Herbarium Expedition to Nova Scotia, 1920; RHODORA, xxiii. (May, 1921 to April, 1922).

glossoides, *Arctostaphylos bulbosa*, *Calopogon pulchellus*, *Myrica carolinensis*, *Rubus recurvicaulis*, *Rosa carolina*, *Gaylussacia dumosa*, var. *Bigeloviana*, *Chelone glabra*, *Solidago rugosa*, *Cirsium muticum*. I have given on p. 128 the Nova Scotia plants native in St. Pierre et Miquelon and *new* to Newfoundland.

The alpine areas of New England and the region bordering the
Gulf of St. Lawrence.

In making use of the Tables prepared by Professor Fernald in his scholarly work, *Persistence of Plants in unglaciated Areas of Boreal America*,¹ we find that the flora of St. Pierre et Miquelon comprises:

a. 41 species out of the 93 arctic species reaching their southern limits in eastern America chiefly on alpine and subalpine areas of New England or northern New York (Table I), or 45%. It is a high proportion which, at first sight, enhances the distinctly alpine character of the flora. To these 41 species should be added *Alchemilla alpina* and *Houstonia Faxonorum*, the latter heretofore considered endemic on the alpine summits on the White Mountains.

b. 5 species out of the 78 arctic plants whose southern limits in America are the region bordering the Gulf of St. Lawrence (Table II). The proportion is only 6% and it is very likely too high, the presence of two of these species, reported only by Gautier, *Lycopodium alpinum* and *Artemisia borealis*, being very doubtful indeed.

c. 16 species out of the 65 boreal, but scarcely arctic, or European plants whose southern limits in America are also the region bordering the Gulf of St. Lawrence (Table III), or 25%.

d. 23 species out of the 297 western or endemic species centering on the Gulf of St. Lawrence—Gaspé, Long Range of Newfoundland, Labrador—and found in neither arctic nor subarctic America nor in Europe, that is about 8%. The plants of northwestern America growing in the French Islands are: *Lycopodium sabinaefolium*, var. *sitchense*, *Juniperus horizontalis*, *Calamagrostis canadensis*, var. *robusta*, *Carex Michauxiana* (Asia), *Listera convallarioides*, *Rumex mexicanus*, *Rubus acaulis*, *Epilobium angustifolium*, var. *macrophyllum*, *Epilobium glandulosum*, *Coelopleurum lucidum*, *Halenia deflexa*, *Anaphalis margaritacea*, var. *subalpina*, *Senecio Pseudo-Arnica* (Asia); that is 13 species out of 155.

¹ Memoirs of the American Academy of Arts and Sciences; Vol. xv, No. III. Boston, 1925.

And the endemics centering about the Gulf of St. Lawrence: *Abies balsamea*, var. *phanerolepis*, *Luzula campestris*, var. *acadiensis*, *Iris setosa*, var. *canadensis*, *Betula Michauxii*,¹ *Cochlearia cyclocarpa*, *Empetrum Eamesii*, *Gentiana nesophila* (?),² *Lonicera villosa*, *Lonicera villosa*, var. *calvescens* (Great Lakes), *Aster radula*, var. *strictus*; that is 10 species out of 142.

(c). *Relations between the Flora of the French Islands and that of the Boreal Hemisphere.*

The 391 native species may be summarily classified as follows: 1st. 210 species exclusively American, or 54%; 2nd. 42 species common to Europe and America, or 11%; 3rd. 19 species common to Asia and America, or 5%; 4th. 120 species common to Europe, Asia and America, or 30%.

1st. American Species.

The 210 American species are subdivided as follows:

a. 25 arctic or subarctic species coming, at low altitude, hardly south of the Gulf of St. Lawrence and reaching the alpine regions of New England; that is 12% of the total of American plants.³

b. 145 boreal species of the temperate regions, many of them going south almost to the 36th degree of latitude (States of Pennsylvania and Virginia) and not going farther north than the lower boundary of the subarctic zone; that is 69% of the total of American plants on the Islands.

If we exclude from this list the 20 species whose southern limit is the Gulf of St. Lawrence, we see that the majority of American plants which invaded the French Islands belong to the temperate regions of northeastern America, and have a southern, rather than a boreal, tendency.

c. 40 species reaching the warm temperate to subtropical zone, that is Georgia, Florida, Louisiana, Texas and Mexico, and not

¹ Reported by Bonnet (De La Pylaie) and Gautier.

² Reported by Gautier (doubtful).

³ I have, in the present classification, treated as *arctic* the S. P. & M. plants contained not only in Tables I and II of the aforementioned work of Professor Fernald, but also those of Table III.

The plants of his Table IV have been placed in the lists of temperate regions, except the Asiatico-American *Rubus acaulis* and the American *Empetrum Eamesii* which have been considered as arctic. I thought it was better not to separate *Rubus acaulis* from *R. arcticus*; as for *Empetrum Eamesii* it has in Miquelon a strong tendency to dispute every inch of ground to arctic plants; it is found on the highest and quite denuded summits; it may yet be discovered in Arctic America.

going farther north than the 50th degree of latitude, or 19% of the American plants on the Islands.

When dealing with the flora of Nova Scotia, I named a good number of these southern or coastal plain species; here are some others: *Glyceria nervata*, *Bromus ciliatus* (var. *denudatus*), *Thalictrum polygamum*, *Cakile edentula*, *Cardamine pensylvanica*, *Sarracenia purpurea*, *Impatiens biflora*, *Oenothera muricata*, *Epigaea repens*, *Galium Claytoni*.

2nd. Species not exclusively American.

A like classification can be made for the plants common to Europe and America, to Asia and America, to Europe, Asia and America, taking into account their area of dispersion in North America.

a. *Europeo-American plants*. They are few in number, 42 species in all: 12 arctic, 26 of the temperate regions, and only 4 reaching the subtropical zone. Several are hardly European: the arctic *Habenaria dilatata* and *Habenaria obtusata* do not grow outside Iceland and the North of Norway; the American *Lobelia Dortmanna* is very rare and local in western Europe; the southern *Eriocaulon septangulare* is found in Europe only in the British Isles (Ireland and Scotland). Others are as sparingly American, as I have already said elsewhere.

b. *Asiatico-American plants*. Less numerous than the preceding—there are only 19—they present, however, some interest. 5 belong to the arctic zone, namely *Elymus arenarius*, var. *villosus*, *Ranunculus Cymbalaria*, *Rubus acaulis*, *Vaccinium Vitis-Idaea*, var. *minus* and *Artemisia borealis*; 9 to the temperate regions, among which are *Osmunda Claytoniana*, *Lycopodium obscurum*, *Mitella nuda*, *Rubus Idaeus*, var. *canadensis*, *Geum macrophyllum*, *Lathyrus palustris*, var. *pilosus*; 5 reach the subtropical zone, namely *Onoclea sensibilis*, *Osmunda cinnanomea* (also native in South America), *Polygonum sagittatum*, *Hypericum virginicum* and *Monotropa uniflora*.

c. *Europeo-Asiatico-American plants*. They constitute by far the most numerous of the three groups not strictly American, numbering 120 species, nearly 1/3 of the native flora.

As was to be supposed, the arctic section, formed of circumpolar plants, is very important: 46 species, which is 39% of the Europeo-Asiatico-American flora and 52% of the whole arctic (or alpine) flora of the Islands.

Here are some of the most remarkable plants of this section:

Equisetum variegatum, *Lycopodium Selago*, *Lycopodium annotinum*, var. *pungens*, *Hierochloe odorata*, *Hierochloe alpina*, *Scirpus hudsonianus*, *Carex scirpoidea*, *Carex rariflora*, *Sagina nodosa*, *Silene acaulis*, var. *excapa*, *Montia lamprosperma*, *Sedum roseum*, *Rubus Chamaemorus*, *Rubus arcticus*, *Epilobium palustre*, *Cornus suecica*, *Arctostaphylos alpina*, *Diapensia lapponica*, *Pinguicula vulgaris*, *Achillea borealis*.

The intermediate section—plants of the temperate regions—comprises 50 species which form 41% of the Europeo-Asiatico-American group, but only 21% of the ensemble of the species of the temperate regions. This fact shows well enough that the invasion of these plants was not so easy as that of the circumpolar plants. In this section we find: *Carex aquatilis*, *Carex Buxbaumii*, *Carex pallescens*, *Carex Oederi*, *Streptopus amplexifolius*, *Listera cordata*, *Corallorhiza trifida*, *Alnus incana*, *Veronica scutellata*, *Veronica serpyllifolia*.

As for the southern section, it does not comprise more than 24 species whose area of dispersion is, in general, very extensive. I may mention: *Potamogeton polygonifolius*, already cited, which grows not only in Europe and Asia, but in Greenland, in Africa and in Australia; *Zostera marina*, *Agropyron repens*, *Lemna minor*, *Juncus bufonius*, *Rumex acetosella*, *Trifolium repens*, *Callitriche palustris*, etc. I have also included in this section *Equisetum sylvaticum*, var. *pauciramosum*, very rare if not unknown in Europe, and which is the usual form of the species in North America.

3rd. Résumé of the Classification.

The following table is a *résumé* of the classification of the American and non-American native plants growing in St. Pierre et Miquelon; it combines the classification in latitude with the classification in longitude.

(d). Conclusion.

If the flora of St. Pierre et Miquelon is not so poor as Dr. Bonnet thought it to be after studying the specimens preserved in the Paris Museum, we may, however, concur with him in the general conclusion that “elle est caractérisée par l’absence d’espèces spéciales et par une identité parfaite avec la flore des contrées voisines.”¹ All its native species and varieties are found either in Nova Scotia or Newfoundland

Bonnet: Florule des I. St. Pierre & Miquelon: Journ. de Bot. 1, p. 264.

	American species	Per cent of the total: 210 species	Europeo-Amer. species	Per cent of the total: 42 species	Asiatico-Amer. species	Per cent of the total: 19 species	Europ.-Asiat.-Am. species	Per cent of the total: 120 species	Totals by categories	Per cent of the general total: 391 species
Arctic or alpine species	25	12	12	29	5	26	46	39	88	22
Percent of the total: 88 spp.	28		12		6		52			
Spp. of temperate regions	145	69	26	62	9	48	50	41	230	59
Per cent of the total: 230 spp.	64		11		4		21			
Spp. reaching subtropical regions	40	19	4	9	5	26	24	20	73	19
Per cent of the total: 73 spp.	54		6		7		33			
Totals by categories	210		42		19		120		391	
Per cent of the general total	54		11		5		30			

and the region bordering the Gulf of St. Lawrence with the possible exception, as far as we know, of two plants: *Alchemilla alpina* and *Houstonia Faxonorum*. The isolation of the Islands has not been sufficient to enable their vegetation to develop not only endemic species but even special varieties and forms.

(To be continued.)

THE IDENTITY OF CLADONIA BEAUMONTII.

C. A. ROBBINS.

(Plate 157.)

A DIFFICULTY confronts the reader who attempts to reconcile Tuckerman's descriptions¹ of *Cladonia Santensis* and its f. *Beaumontii* with those of Wainio.² No allowance for individual difference in the choice of defining terms will account for the lack of agreement between the two sets of descriptions, and a suspicion is bound to arise that the plants actually differ as greatly as the descriptions do;

¹ Tuckerman, *Syn. Lich.* 1: 245. 1882.

² Wainio, *Act. Soc. Faun. Fl. Fenn.* 4 (Mon. Clad. 1): 410: 1887
Clad. 2): 455. 1894.